CLAIMS

1. Charged particle emission component for providing a charged particle beam, comprising:

a first UHV region (102);

a second UHV region (104); and

a residual gas diffusion barrier (106; 206) separating the first and the second UHV region;

whereby the first UHV region does not comprise elements, which essentially block a portion of the charged particle beam; and

wherein the first and the second UHV region (102, 104) each have a vacuum flange (102a, 104a).

2. Charged particle emission component according to claim 1, further comprising an emitter (16) in the first UHV region for emitting the beam of charged particles (17).

3. Charged particle emission component according to any of the preceding claims, further comprising an aperture unit (110) for differential pumping between the emission component and a further chamber (112) of a charged particle beam column.

4. Charged particle emission component according to any of the preceding claims, whereby the residual gas diffusion barrier has an opening (107) with a diameter larger than the diameter corresponding to the beam emission angle; preferably with a diameter corresponding to a beam emission angle of minimal 10°.

5. Charged particle emission component according to any of the preceding claims, wherein the residual gas diffusion barrier (106; 206) has an opening (107) for the charged particle beam, the opening has a size of at least 1 mm, preferably of at least above 5mm.

6. Charged particle emission component according to any of the preceding claims, wherein the residual gas diffusion barrier acts (106; 206) as an extraction electrode for extracting or modulating the emitted charged particles.

7. Charged particle emission component according to any of the preceding claims, further comprising at least one beam shaping element (109; 18; 108; 402) in the second UHV region (104), wherein the at least one beam shaping element blocks a portion of the charged particle beam by having an opening for the charged particle beam, the opening has a size corresponding to a beam emission angle of below 5°, preferably of below 1°.

8. Charged particle emission component according to any of the preceding claims 7, wherein the first and the second UHV region have in operation a pressure of maximal 10^{-3} mbar.

9. Charged particle emission component according to any of the preceding claims, wherein the first and the second UHV region have in operation a pressure difference of maximal one magnitude.

10. Charged particle emission component according to any of the preceding claims, wherein the amount of charged particles impinging on surfaces located in the first UHV region is maximal 20 % of the amount of charged particles impinging on surfaces located in the emission component.

11. Charged particle emission component according to any of the preceding claims, wherein the first vacuum flange (102a) corresponding to the first UHV region (102) and the second vacuum flange (104a) corresponding to the second UHV region (104) are connected to one vacuum pump (502).

12. Charged particle emission component according to any of the preceding claims, wherein the first vacuum flange corresponding to the first UHV

region and the second vacuum flange corresponding to the second UHV region are connected to separate vacuum pumps (502a, 502b).

13. Charged particle emission component according to any of the preceding claims, wherein the residual gas diffusion barrier is an isolating aperture and the first and the second UHV regions are UHV chambers.

14. Charged particle emission component for providing a charged particle beam, comprising:

a housing (101) of the charged particle emission component;

an emitter (16) for emitting a beam of charged particles (17) with a beam emission angle;

at least one beam shaping element (109; 18; 108; 402); and

a residual gas diffusion barrier (106; 206) directly subsequent to the emitter, whereby the residual gas diffusion barrier separates the charged particle emission component in a first and a second UHV region,

whereby the residual gas diffusion barrier has an opening (107) with a diameter larger than the diameter corresponding to the beam emission angle; and

wherein the first and the second UHV region (102, 104) each have a vacuum flange (102a, 104a).

15. Charged particle emission component according to claim 14, whereby the first UHV region does not comprise elements, which essentially block a portion of the charged particle beam.

16. Charged particle emission component according to any of claims 14 to 15, further comprising any of the features of claims 1 to 13.

17. Charged particle emission component according to any of claims 1 to 16, wherein the surfaces of the first UHV region are the surfaces of at least the following components:

the emitter (16),

the residual gas diffusion barrier,

the part of the emission component housing (101) corresponding to the first UHV region, and

and wherein the surfaces of the second UHV region are the surfaces of at least the following components:

the at least one beam shaping element,

the differential pumping aperture (109; 18; 108; 402),

the part of an emission component housing corresponding to the second UHV region.

18. Charged particle beam device making use of a charged particle emission component according to any of the preceding claims.

19. Method of operating a charged particle beam device, comprising the steps of:

evacuating a first UHV region to a pressure of maximal 10^{-8} mbar;

evacuating a second UHV region to a pressure of maximal 10^{-8} mbar;

evacuating at least a further chamber to a pressure of maximal 10^{-5} mbar; and

emitting a charged particle beam such that a portion of the charged particle beam is essentially not blocked within the first UHV region.

20. Method of operating a charged particle beam device according to claim 19, whereby

the charged particles are emitted with an emission angle such that the amount of charged particles impinging on surfaces located in the first UHV region is maximal 20 % of the amount of charged particles impinging on surfaces located in the first and the second UHV region.

21. Method of operating a charged particle beam device according to any of claims 19 to 20, whereby

a portion of the beam is blocked in the second UHV region, such that the beam is shaped.